NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

SINKHOLE TREATMENT
(No.)
Code 725-Interim

DEFINITION

An excavation, cleanout, filter treatment, sealing, and refilling of a sinkhole to reduce the entry of sediment and pollutants into ground water resources.

PURPOSE

Sinkhole treatment measures are installed to reduce direct ground water pollution from chemicals or sediment by diverting or controlling surface water inflow to open sinkholes or depressions where geologic formations are subject to sinkhole development.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to areas where geologic conditions are conducive to subsidence and sinkhole development and where one or more of the following conditions exist:

- Where surface water runoff from eroding areas discharge into sinkholes.
- Where surface water runoff from impervious areas such as parking lots, streets, or other commercial developments discharge into sinkholes.
- Where surface water runoff from feedlots or water that traverses feedlots contains excessive amounts of contaminants and discharges into sinkholes.
- Where the land management measures can be made more efficient by sinkhole treatment.

DESIGN CRITERIA

General Criteria

Sinkhole treatment methods are site specific depending on:

1. Location of sinkhole.
2. Size of sinkhole.
3. Ground water contamination sensitivity.
4. Effects of sealing and diverting runoff.
5. Condition of bedrock.

Emphasis in sinkhole treatment shall be given to preventing the entry of contaminant-laden runoff into the bedrock and ground water. Where possible, the sinkhole should be treated by diverting surface runoff away from the sinkhole. That portion of the sinkhole drainage area still draining to the sinkhole shall be treated to prevent erosion.

Backfilling of the sinkhole is optional. Where diverting surface runoff away from the sinkhole is not possible, the sinkhole should be backfilled and sealed.

Specific Criteria

Sinkhole treatment measures shall be designed according to specific site conditions considering land use and management measures planned.

The engineer or technician shall determine the need for, and extent of, geologic investigations of the site.

Design criteria for other practices used in conjunction with this standard shall be in accordance with standards contained in the Field Office Technical Guide.

All federal, state, and local laws, rules and regulations applicable to this practice or component practice shall be strictly adhered to. The owner, operator, or sponsor shall be responsible for securing all necessary permits as required.

Treatment Options

Surface runoff. Practices for diverting surface runoff are diversions, waterways, and terraces and water and sediment control basins using surface or underground outlets. Design criteria for these practices shall be according to standards in the Field Office Technical Guide

Fencing. Where backfilling and grading is not practical, fencing shall be provide if needed for the safety of humans and livestock.

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Backfill. The backfilling of the sinkhole is related to the intended treatment.

Backfill Preparation. Overburden shall be removed as needed to provide a stable foundation for the backfill. Ideally, enough overburden should be removed to expose sound bedrock around the void(s).

Initial Backfill. Initial backfill material shall be placed directly on material that does not have the ability to migrate into the identified bedrock void. Initial backfill shall be of such material that it also will not have the ability to migrate into the void. Concrete can also be used by itself or in conjunction with rocks to bridge the void. Initial backfill shall be free draining into the void and not intended to seal the void. Internal conduits through bedrock shall not be blocked or sealed.

Backfill when preventing inflow of surface runoff. Backfill above the initial backfill shall be in layers of suitably graded material so as not to migrate into the previous layer. Compaction of backfill shall be by tamping rollers or loaded rubber tired earthmoving equipment. When the sinkhole is backfilled to field elevations, a 1 to 2 feet or more crown of the backfill shall be provided to allow for settlement and provide surface water drainage. It may be necessary to construct conservation practices to control this surface water to an adequate outlet.

Sealing. For those sites requiring a sealing layer the sealing layer of backfill shall extend a minimum of 3 feet on all sides of the sinkhole opening. Consideration should be given to sealing a wider area when water will be ponded above the sinkhole. The sealing layer shall be a minimum of 2 ft. thick. The backfill immediately beneath the sealing layer shall be graded to prevent the migration of the sealing layer material into underlying material. The sealing layer should comprise of compacted plastic soils with PI's greater than 5.

When plastic soils are not available, geomembranes or geosynthetic clay liners (GCL's) may be used. The installation of geomembranes or GCL's shall follow the manufactures recommendations. A minimum of 4 feet of backfill shall be placed over the top geomembranes or GCL's.

All sealing layers shall be crowned 2 feet in the center and graded outward in all directions.

Vegetative cover. An adequate protective cover of grasses shall be established on earthwork where it is necessary to protect against erosion from flood flows, rainfall, wave action, or runoff.

OPERATION AND MAINTENANCE

The owner/operator, or units of government holding agreements with owner/operators, shall be responsible for maintaining the improvement according to the plan developed and provided to the owner/operator or to the governmental unit.

SAFETY

Safety features and devices as appropriate will be considered and included in the planning, design, construction, and operation of the improvement. Safety devices include fencing and warning signs for sinkholes not backfilled.

PLANS AND SPECIFICATIONS

Plans and specifications shall be in keeping with this standard and describe the requirements for proper installation of the practice to achieve its intended purpose. Plans and specifications shall be developed to insure that erosion during construction will be minimized so that temporary pollution of air and water is within tolerable limits.